

What is claimed is:

1. A drinking water process providing a fully treated water comprising:

- a. passing raw water into a specially treated cathode of an electrolytic cell water treatment system aggregating colloids of turbidity and color, removing phosphorous, removing nitrate nitrogen and microbial life;
- b. passing the special cathode treated fluid into a holding chamber for a set time to provide additional time for microbial kill at the high pH;
- c. passing the special cathode treated fluid from the holding zone to a microporous filter;
- d. passing the microporous filter effluent to an anodic electrode part of the electrolytic cell where oxidation products are produced;
- e. passing the anodic electrode effluent to a holding zone for a set amount of time with the anodic oxidation products;
- f. passing the effluent from the anode holding zone to the drinking water distribution system with removal of turbidity and color, phosphorous, nitrate nitrogen and microbial life and addition of residual chlorine.

2. The drinking water process according to claim 1 comprising: the addition of an anodic cell treatment at low pH allowing the oxidation by anodic oxidants of the microbial life and organic materials.

3. The drinking water process according to claim 2 comprising: the zone of anodic  
oxiation at low pH for a set holding period.

4. The drinking water process according to claim 3 comprising: where the anodic cell  
effluent after low pH treatment is passed to a cathodic zone for pH neutralization of the  
5 anodically treated water.

5. The drinking water process according to claim 1 comprising: a selective cation  
membrane in addition the existing membrane separating the cathode and anode zones.

6. The drinking water process according to claim 5 comprising: an addition of alkaline  
earth cations to the anodic zone to neutralize acidity and supply alkaline earth ions to  
10 the special cathodic zone where the alkaline earth ions are precipitated at the high pH.

7. A drinking water process providing a fully treated water comprising: a periodic  
reversal of the polarity of the electrolytic cell to dissolve the carbonate film on the  
special cathode surface.

8. The drinking water process according to claim 7 comprising: a periodic addition of  
15 acid to dissolve the carbonate film on to the special cathode electrode.

9. The drinking water process according to claim 1 comprising: a specially treated

cathode electrode based on a valve metal or alloy there of treatment.

10. The drinking water process according to claim 1 comprising: an anodic zone oxidant level to oxidize ammonia nitrogen to nitrogen gases.

5 11. The drinking water process according to claim 1 comprising: a specially treated cathode to reduce nitrate nitrogen to nitrogen gas.

12. The drinking water process providing a fully treated wastewater comprising: a process wherein one electrolytic cell is placed on top of another electrolytic cell.

13. The drinking water process according to claim 1 comprising: a series of electrolytic cells built upward from the bottom electrolytic cell.

10 14. The drinking water process according to claim 1 comprising: the use of a back-pulse microporous filter for the filtering method.

15. The drinking water process according to claim 1 comprising: an anodic electrode of high current density for ammonia removal.

15 16. The drinking water process according to claim 1 comprising: an anodic electrode of electro-sorptive capacity or low current density for soluble organic oxidation.

17. The drinking water process according to claim 1 comprising: both an anodic high density electrode for ammonia removal and an anodic low density electrode for organic oxidation.

18. A pollutant removal process providing a fully treated wastewater comprising:

- 5       a. passing secondary treated wastewater effluent into a specially treated cathode of an electrolytic cell wastewater treatment system aggregating and filtering colloids of turbidity and color, removing phosphorous, nitrate nitrogen and microbial life.
- 10       b. passing the specially treated cathode effluent to a specific holding zone for a specific holding time at high pH;
- c. passing the holding zone effluent to a microporous filter
- d. passing the effluent of the microporous filter to an anoxic zone where anodic oxidants are produced.
- 15       e. passing the effluent of the anodic zone to a anodic holding zone where the anodic oxidants oxidize ammonia nitrogen and organics.
- f. passing the effluent of the anoxic zone to the receiving water or to water reuse.

19. The pollution removal process according to claim 18 comprising: the addition of an anodic cell treatment at low pH allowing the oxidation by anodic oxidants of the microbial life and organic materials.

20. The pollution removal process according to claim 19 comprising: the zone of anodic oxidation at low pH for a set holding period.

21. The pollution removal process according to claim 18 comprising: where the anodic cell effluent after low pH treatment is passed to a cathodic zone for pH neutralization of the anodically treated water.

22. The pollution removal process according to claim 18 comprising: a selective cation membrane in addition the existing membrane separating the cathode and anode zones.

23. The pollution removal process according to claim 18 comprising: an addition of alkaline earth cations to the anodic zone to neutralize acidity and supply alkaline earth ions to the special cathodic zone where the alkaline earth ions are precipitated at the high pH.

24. The pollution removal process providing a fully treated wastewater comprising: a periodic reversal of the polarity of the electrolytic cell to dissolve the carbonate film on the special cathode surface.

25. The pollution removal process according to claim 24 comprising: a periodic addition of acid to dissolve the carbonate film on to the special cathode electrode.

26. The pollution removal process according to claim 18 comprising: a specially treated cathode electrode based on a valve metal or alloy thereof treatment.

27. The pollution removal process according to claim 18 comprising: an anodic zone oxidant level to oxidize ammonia nitrogen to nitrogen gases.

5 28. The pollution removal process according to claim 18 comprising: a specially treated cathode to reduce nitrate nitrogen to nitrogen gas.

29. The pollution removal process providing a fully treated wastewater comprising: a process wherein one electrolytic cell is placed on top of another electrolytic cell.

10 30. The pollution removal process according to claim 29 comprising: a series of electrolytic cells built upward from the bottom electrolytic cell.

31. The pollution removal process according to claim 18 comprising: the use of a back-pulse microporous filter for the filtering method.

32. The pollution removal process according to claim 18 comprising: an anodic electrode of high current density for ammonia removal.

15 33. The pollution removal process according to claim 18 comprising: an anodic

electrode of electro-sorptive capacity or a anodic low current density for soluble organic oxidation.

34. The pollution removal process according to claim 18 comprising: both an anodic high density electrode for ammonia removal and an anodic low density electrode for organic oxidation.

35. The pretreatment of water, primary treated wastewater and secondary treated wastewater to remove colloids according to processes in claim 1 and claim 18 respectively before treatment by microporous membranes such as ultrafilters, nanofilters, and reverse osmosis membranes.

36. The pretreatment of primary treated wastewater and secondary treated wastewater to remove colloids according to processes in claim 1 and claim 18 respectively to improve the rate of biological oxidation.

37. The pretreatment of any contaminated fluid to remove colloids according to processes in claim 1 and claim 18.

38. The treatment of water for removal of nitrate-N according to claim 1.

39. A drinking water process according to claim 1 comprising the treatment of drinking

water to remove colloids before disinfection to improve the disinfection efficiency by oxidants such as chlorine and ozone and improve the disinfection and operation efficiency of radiation units such as ultraviolet (UV) light.

40. A drinking water process according to claim 1 comprising the treatment of drinking water to remove colloids before passing the liquid through an electrolytic disinfection unit.

41. A drinking water process according to claim 1 comprising the treatment of drinking water to remove colloids before disinfection to improve the disinfection efficiency by toxic chemical agents such as phenol, heavy metals such as cadmium, pH such as high hydrogen ions and/or low hydrogen ions, temperature such as high degrees centigrade, and radiation such as electromagnetic, acoustic and particle.

42. A drinking water process according to claim 1 comprising the treatment of drinking water to remove colloids containing toxic matter such as endocrine disrupter biochemicals.

43. A drinking water process according to claim 1 comprising the treatment of drinking water to remove colloids containing only inorganic or only organic constituents.

44. A drinking water process according to claim 1 comprising the treatment of drinking



water to remove colloids containing both inorganic and organic constituents.

45. The pollution removal process according to claim 18 comprising the treatment of treated wastewater to remove colloids before disinfection to improve the disinfection efficiency by oxidants such as chlorine and ozone and improve the disinfection and  
5 operation efficiency of radiation units such as ultraviolet (UV) light.

46. The pollution removal process according to claim 18 comprising the treatment of treated wastewater to remove colloids before passing the liquid through an electrolytic disinfection unit.

47. The pollution removal process according to claim 18 comprising the treatment of  
10 treated wastewater to remove colloids before disinfection to improve the disinfection efficiency by toxic chemical agents such as phenol, heavy metals such as cadmium, pH such as high hydrogen ions and/or low hydrogen ions, temperature such as high degrees centigrade, and radiation such as electromagnetic, acoustic and particle.

48. The pollution removal process according to claim 18 comprising the treatment of  
15 treated wastewater to remove colloids containing toxic matter such as endocrine disrupter biochemicals.

49. The pollution removal process according to claim 18 comprising the treatment of

treated wastewater to remove colloids containing only inorganic or only organic constituents.

50. The pollution removal process according to claim 18 comprising the treatment of treated wastewater to remove colloids containing both inorganic and organic

5 constituents